

Kidney Disease

Research Updates

National Kidney and Urologic Diseases Information Clearinghouse

Winter 2013

NFHN Trial Group Finds Frequent Hemodialysis Promotes Heart Health

Additional Studies Have Mixed Results on Physical Performance

Most patients on hemodialysis have a standard schedule of three sessions a week for 3 to 5 hours each session. While this schedule keeps patients alive, many still have serious health problems related to their kidney failure, such as heart disease. And the mortality rate for patients on hemodialysis is high. The Frequent Hemodialysis Network (FHN) Trial Group was formed in 2005 to explore whether alternative schedules with more frequent hemodialysis sessions would reduce the mortality and morbidity associated with hemodialysis.

Supported by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), the FHN Trial Group developed two separate trials. In the Daily Trial, one group of participants received hemodialysis six times a week for 1.5 to 2.75 hours a session while another group received the standard 3 sessions a week. In the Nocturnal Trial, one group of participants received dialysis for 6 to 8 hours overnight for six nights a week while, again, the other group received the conventional hemodialysis treatment.

Results of the two trials are now being reported in a wide range of medical journals. The journal articles focus on many different aspects of frequent hemodialysis, including its effect on physical performance, body composition, and blood pressure control. One significant article deals with left ventricular hypertrophy (LVH).



Frequent Hemodialysis and LVM

Christopher Chan, M.D., of the University Health Network, Ontario, Canada, led a group that examined the effect of frequent hemodialysis on left ventricular mass (LVM). Enlargement

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of muscles in the left ventricle, one of the heart's pumping chambers, is a sign of heart disease. In the March 2012 issue of *Circulation: Cardiovascular Imaging*, Dr. Chan and colleagues reported that participants receiving daily hemodialysis had a significant reduction in LVM, and those who already had the greatest LVM at baseline received the greatest benefit. Participants receiving long, overnight hemodialysis did not achieve a statistically significant LVM reduction, although the results trended in that direction. Participants receiving conventional hemodialysis saw no LVM benefit.

Dr. Chan and colleagues looked at other clinical factors that may have contributed to the beneficial effect of daily hemodialysis, including volume removal, blood pressure, and solute clearance. Changes in LVM were associated most closely with changes in blood pressure and were not significantly associated with the

other clinical factors. Dr. Chan and colleagues concluded that frequent hemodialysis reduces LVM, possibly with the help of improved blood pressure control.

Additional Studies

In additional studies, the FHN Trial Group found that more frequent hemodialysis did not have significant effects on measures of nutritional status or objective measures of physical performance, although participants reported that they perceived an improvement in their performance. Additional benefits included better phosphorus and blood pressure control. Researchers also found that participants who received daily or nocturnal hemodialysis had more problems with their vascular access, the modified blood vessel where needles are inserted for dialysis.

With these mixed results, researchers have concluded that more frequent hemodialysis could be of benefit to some people. ■

Would you like to know more about NIDDK-supported research?

The National Institutes of Health (NIH) provides access to a variety of reporting tools, reports, data, and analyses of NIH research activities at the Research Portfolio Online Reporting Tools (RePORT) website, www.projectreporter.nih.gov/reporter.cfm. One of the tools available is RePORT Expenditures and Results (RePORTER), which allows users to search a repository of NIH-funded research projects and access and download publications and patents resulting from NIH funding. ■

Kidney Disease

Research Updates

Kidney Disease Research Updates, an email newsletter, is sent to subscribers by the National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC). The newsletter features news about kidney disease, special events, patient and professional meetings, and new publications available from the NKUDIC and other organizations.

You can read or download a PDF version or subscribe to the newsletter at www.kidney.niddk.nih.gov/about/newsletter.aspx.

Executive Editor: Andrew S. Narva, M.D., F.A.C.P.

Dr. Narva is the director of the National Kidney Disease Education Program (NKDEP) within the National Institute of Diabetes and Digestive and Kidney Diseases. Prior to joining the NKDEP in 2006, he served as chief clinical consultant for nephrology and director of the Kidney Disease Program for the Indian Health Service. He has served as a member of the Medical Review Board of End-Stage Renal Disease Network 15, the NKF Kidney Early Evaluation Program, and on the Steering Committee for the National Quality Forum Renal Endorsement Maintenance Project. Dr. Narva serves on the Expert Panel on Clinical Guidelines on High Blood Pressure (JNC 8), the NKF KDOQI Work Group on Diabetes in Chronic Kidney Disease, and the Working Group on CKD, International Federation of Clinical Chemistry and Laboratory Medicine.



KUH Conferences Advance Understanding, Approaches to Fields

From NIDDK Director's Update

In February, NIDDK's Division of Kidney, Urologic, and Hematologic Diseases held the "NIDDK KUH Winter Conferences 2012," a series of workshops on topics including kidney genetics, hematopoiesis, kidney morphology, and nonmalignant hematology. The workshops served many goals.

On Feb. 11 and 12, the first conference of the group, "Whole Genome Approaches to Complex Kidney Diseases," met in Bethesda, MD, to address questions such as how to help the nephrology research community make use of next-generation sequencing capabilities that have made whole exome studies—studies that use an approach that decodes the 1 to 2 percent of the genome that contains protein-coding genes—accessible for clinical research.

The conference convened to evaluate study designs and existing DNA repositories and databases that are relevant to whole exome studies; to learn about emerging statistical approaches to effectively evaluate and analyze the myriad variants identified in whole exome studies; to consider the optimal ways to perform whole exome research, in terms of ethical, legal, and social aspects; and to discuss how best to transmit complicated findings to patients when these whole exome approaches become a routine part of clinical nephrology practice.

"Whole exome testing is already being marketed to consumers and will likely be a part of routine clinical practice, at least when addressing particular clinical problems, within the next decade," said NIDDK intramural researcher Dr. Jeffrey Kopp, co-chair of the conference. "This will require physicians who see kidney patients to help their patients understand such concepts as carrier status, recessive genes, susceptibility alleles, and clinical risk estimates. Physicians will often require additional training

in genetic medicine and access to NIH databases that provide current information on the clinical implications of particular genetic variants."

On Feb. 13 and 14, NIDDK held a conference, "Quantitative Morphology in Kidney Research," to review techniques to count the number of glomeruli and some of their component cells called podocytes, in kidneys. There is evidence that glomerular endowment is affected by genetic factors and by environmental exposures during gestation, and that low glomerular numbers are associated with an increased risk for chronic kidney disease in adulthood. Speakers discussed stereology, a set of techniques used to estimate features of three-dimensional objects from lower-dimensional samples, and considered stereologically valid approaches to assessing kidney samples from humans and experimental animals.

"Stereology offers a sophisticated suite of methods to count and measure objects," said Kopp. "These methods can be applied to research material ranging from whole organs to a few tissue sections. It is critical that researchers select the most appropriate method for their purpose and their material, as only stereologically sound techniques will produce valid data and lead to sound conclusions."

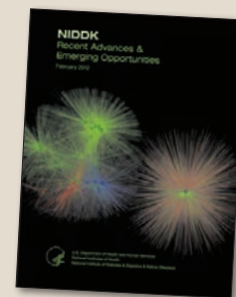
On Feb. 20, the NIDDK held a "state of the science" workshop, "Regulatory Determinants of



2012 Edition of NIDDK's Annual Scientific Report Now Available

From NIDDK Director's Update

The NIDDK annual scientific report, *NIDDK Recent Advances & Emerging Opportunities*, is now available. This report highlights examples of NIDDK-supported research advances published in fiscal year 2011. It also includes stories of discovery, which trace research progress in specific areas over a longer time frame; profiles of patients who are benefiting from NIDDK-supported clinical research; and highlights scientific presentations made to the NIDDK Advisory Council during 2011. This year's report includes information on the cutting-edge NIDDK-supported research being conducted on the microbiome—the collection of microorganisms that reside in and on the human body, including the digestive tract. These microbes can influence a range of physiological traits, diseases, and conditions.



To read the report, go online to www.niddk.nih.gov. Or request a hard copy via the message box at <http://catalog.niddk.nih.gov/ContactUs.cfm>, by calling 1-800-860-8747 between 8:30 a.m. and 5 p.m. ET Monday through Friday, or by writing to NIDDK Clearinghouses Publications Catalog, 5 Information Way, Bethesda, MD 20892-3568. ■

KUH CONFERENCES, continued from page 3

Hematopoietic Stem Cell Self-Renewal, Lineage Commitment and Terminal Differentiation: New Insights.” The workshop’s objectives were to provide an opportunity for research leaders in the field of hematopoietic stem cell (HSC) biology to examine current understanding of how HSC self-renewal, lineage commitment, and terminal differentiation are regulated; to define knowledge gaps and key unanswered questions in these critical aspects of HSC biology; and to define opportunities, directions, and priorities for future research to address these questions.

NIDDK Senior Scientific Advisor and Program Director for Hematology Research Dr. Daniel Wright, principal organizer of the workshop, was pleased with the capacity attendance of more than 140 researchers from around the country and Canada, reflecting a high level of interest in the workshop’s focus and objectives.

On Feb. 23 and 24, NIDDK’s Nonmalignant Hematology Research Network, or

HEME-NET, held a meeting in Rockville, MD. The workshop marked the first time this group of NIDDK hematology grantees had met face-to-face to share research activities, build relationships between researchers in the field of NIDDK hematology interests, learn about NIDDK-funded resources available through the Centers of Excellence in Molecular Hematology, and assemble a prototype for the network.

“The meeting was enthusiastically attended by investigators, who overwhelmingly supported the notion of building a network to facilitate communication and collaboration among members and to inform the community at large about research accomplishments in nonmalignant hematology,” said NIDDK Hematology Program Director Dr. Terry Bishop. “Attendees felt that HEME-NET could leverage and strengthen the field by fostering the exchange of ideas and by posting collaborative opportunities and available resources.”

KUH Initiative Seeks Community-level Solutions for Treating CKD

From NIDDK Director's Update

The NIDDK's Division of Kidney, Urologic, and Hematologic Diseases (KUH) is breaking new ground by funding an initiative to improve outcomes by testing methods to translate chronic kidney disease (CKD) research into routine clinical practice.

"In order to improve outcomes for patients with CKD we must narrow the gap between clinical research and clinical practice."

Andrew Narva, M.D.
NKDEP Director

Under the initiative, five projects are testing the effectiveness of approaches that are highly likely to be adopted and sustained in a wide range of health care settings and by individuals and communities at highest risk for CKD. Projects selected for funding had to demonstrate that their approaches would not require extraordinary new or additional resources and could be adapted to settings with limited resources where high-risk communities are served, such as community health centers.

"We have interventions which have been proven to prevent or slow the progression of CKD," said Andrew Narva, M.D., who oversees the grants and directs the National Kidney Disease Education Program (NKDEP). "Unfortunately, we have not been successful in implementing these proven therapies in the community. We need to test new approaches."

CKD, a condition in which the kidneys gradually lose function, affects an estimated

23 million American adults. Diabetes and high blood pressure are the most common causes of CKD. The projects, which began last fall and will continue through 2016, are studying several ways to improve care for patients with CKD, including the use of health information technology such as enhanced electronic health records and patient registries, techniques to help patients manage their own care, and educational materials and resources for patients and health care providers.

"In order to improve outcomes for patients with CKD we must narrow the gap between clinical research and clinical practice," said Narva. "We need to figure out how to deliver appropriate care to those who need it. We hope to use the knowledge gained from this research to inform the work of NKDEP."

To learn more, contact Dr. Narva at narvaa@mail.nih.gov. ■

KUH CONFERENCES, continued from page 4

NIDDK workshops continued through the spring. In April, experts convened to discuss "Glomerular Disease: Pathophysiology, Biomarkers, and Registries for Facilitating Translational Research." Goals addressing glomerular disease included discussing mechanisms that initiate and drive progression of glomerular diseases to end-stage kidney disease; exploring targets and pathways to therapeutic

development; assessing existing biomarkers that define diagnosis, initiation, progression, and relapse; and discussing approaches to potential cooperation with industry, academia, government, and others. International experts from industry and academia as well as representatives from the NIH, FDA, and private foundations discussed the challenges and pitfalls of glomerular disease research and formulated the path forward. ■

NIH-funded Study Finds More Precise Way to Estimate Kidney Function

New Equation Can Be Used for Broader Range of Patients

From NIH News

Measuring creatinine and cystatin C—two markers for chronic kidney disease (CKD)—more precisely estimates kidney function than either marker alone, according to a study funded by the National Institutes of Health. Results appear in the July 5 issue of the *New England Journal of Medicine*.

“The new creatinine-cystatin equation is more accurate over a broader range of kidney function and body size, and less altered by other medical conditions.”

Lesley Inker, M.D.
Tufts Medical Center

“Glomerular filtration rate, or GFR, estimates based on creatinine in the blood are routinely used to measure kidney function and diagnose chronic kidney disease. However, estimating GFR using creatinine alone is imprecise and may lead to over-diagnosis in some patients,” said Dr. Lesley Inker, a nephrologist at Tufts Medical Center in Boston and lead study author.

According to Dr. John Kusek, study co-author and senior scientific advisor, Division of Kidney, Urologic, and Hematologic Diseases at the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), part of NIH, the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) study illustrates the importance of research to more accurately estimate kidney function in order to improve the certainty of CKD diagnosis. “The findings in this most recent work represent an important step in that direction,” he said.

Creatinine is a waste product from protein in the diet and the normal breakdown of muscle tissue. Cystatin C is released by cells throughout the body. The kidneys remove both creatinine and cystatin from the blood. As kidney function worsens, the creatinine and cystatin levels in the blood increase.

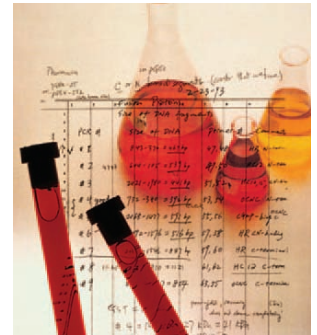
“The new creatinine-cystatin equation is more accurate over a broader range of kidney function and body size, and less altered by other medical conditions,” said Inker. “Estimating

kidney function based on creatinine and cystatin C could be used as a confirmatory test for chronic kidney disease in patients with an estimated GFR near 60—the usual threshold for diagnosing chronic kidney disease—although it will need to be standardized before the equation can be used widely.”

Testing kidney function is often part of routine medical care for adults, according to Inker. More than 80 percent of clinical laboratories currently estimate GFR from serum creatinine. Despite efforts to standardize serum creatinine measurement across all labs, GFR estimates remain relatively imprecise due to variation in creatinine levels that are not related to GFR, such as those affected by differences in muscle mass, malnutrition, and other chronic illnesses. This imprecision can potentially misclassify patients as having CKD when they may not, or conversely, miss the diagnosis in patients who do have CKD. Over-diagnosis can lead to unnecessary treatment such as medication and dietary changes.

CKD-EPI study estimated kidney function based on creatinine alone and with cystatin C, developed in a diverse group of 5,352 people from 13 studies that measured kidney function.

The creatinine-cystatin C equation performed better than equations using only creatinine or cystatin C. In people whose estimated kidney



NIH Research Featured in HBO Documentary Series on Obesity

From NIH News

"If we don't take the obesity epidemic seriously as individuals and as a nation, we will pay a serious price."

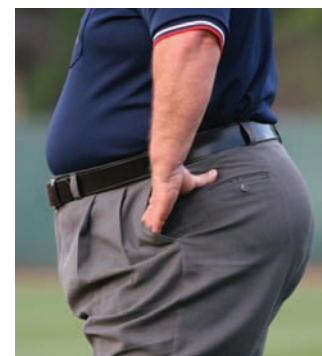
Francis S. Collins, M.D., Ph.D.
NIH Director

The Weight of the Nation documentary series and public awareness campaign by the cable network HBO, launching this week, features National Institutes of Health research showing how obesity affects the country's health and how interventions can turn the tide against obesity and its complications.

The network, in consultation with NIH and other major health organizations, developed four documentaries focused on obesity. The project also includes a three-part HBO Family series for kids, 12 short features, a social media campaign, and a nationwide community-based campaign to mobilize action to move the country to a healthier weight.

The films feature several NIH-funded clinical studies that have formed the basis of scientific evidence on the causes and consequences of being overweight or obese, including the Diabetes Prevention Program (DPP), Coronary Artery Risk Development in Young Adults (CARDIA) study, and Bogalusa Heart Study. The DPP found that even moderate weight loss can help prevent type 2 diabetes. The CARDIA study measures changes in coronary heart disease risk factors. The Bogalusa Heart Study examines how cardiovascular disease develops over time.

"If we don't take the obesity epidemic seriously as individuals and as a nation, we will pay a serious price," said NIH Director Francis S. Collins, M.D., Ph.D., who appears in all of the main documentaries in the series. "It's going to take diverse and rigorous research to understand the causes of obesity and to identify interventions that work in the real world. The results from federally funded research, as seen in these documentaries, can help to prevent and treat obesity and its complications."



More than one-third of adults in the United States and nearly 17 percent of the nation's children are obese, which increases their chances of developing many health problems, including type 2 diabetes, heart disease, high blood pressure, stroke, fatty liver disease, and some cancers. In 2008, the nation's obesity-related medical costs were an estimated \$147 billion.

In fiscal year 2011, NIH funding for obesity research totaled \$830 million. The 2011 Strategic Plan for NIH Obesity Research highlights the crucial role of research in efforts to reduce obesity, emphasizing moving science from laboratories to clinical trials to practical solutions. The plan is designed to help target efforts and resources in areas most likely to help people.

Results from NIH-funded obesity-related research include:

- Finding effective lifestyle changes that can be implemented in communities to reduce weight, lower risk factors for heart disease, and prevent or delay type 2 diabetes
- Finding new targets and pathways for prevention and treatment of obesity, including the role of sleep, and how bacteria in the intestine may have an impact on obesity

OBESITY DOCUMENTARY,
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NIH Encourages Reducing Disparities in Kidney Transplantation

From NIH news



"Part of the solution to the disparity in transplantation is to ensure that providers refer appropriate patients for transplant evaluation as soon as they've been diagnosed with kidney failure."

Griffin P. Rodgers, M.D.
NIDDK Director

The National Institutes of Health is promoting efforts to reduce disparities in organ transplantation. This is particularly important among African Americans, Hispanics, and American Indians, all of whom are disproportionately affected by kidney failure—yet are less likely to receive organ transplants.

More than 20 million adults in the United States have chronic kidney disease, with an additional 400,000 people currently depending on dialysis to treat kidney failure, according to the U.S. Renal Data System. Of the more than 80,000 people on the national waiting list for a kidney transplant, 35 percent are African American and nearly 19 percent are Hispanic, although they make up only 13 percent and 16 percent of the U.S. population, respectively.

"Part of the solution to the disparity in transplantation is to ensure that providers refer appropriate patients for transplant evaluation as soon as they've been diagnosed with kidney failure," said Griffin P. Rodgers, M.D., director of the NIH's National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). "It's also important that more African Americans and Hispanics register as organ donors and talk with loved ones about doing the same to increase the pool of kidneys available for transplantation."

NIDDK is leading several initiatives to help reduce disparities in organ transplantation:

- The NIDDK, in collaboration with the NIH's National Institute on Minority Health and Health Disparities, funds the Minority Organ and Tissue Donation Program, which

supports research on disparities in access to transplantation. Learn more about this program at <http://www2.niddk.nih.gov/AboutNIDDK/Organization/Divisions/KUH/KUHmotd.htm>.

- NIH's National Kidney Disease Education Program (NKDEP) provides health professionals with tools and resources to educate at-risk populations about kidney failure treatments, including transplantation. Learn more about these resources at www.nkdep.nih.gov/identify-manage.shtml.
- The Kidney Interagency Coordinating Committee brings federal agencies together to collaborate in a multi-faceted response to kidney disease, aiming to make efforts to reduce disparities more successful. Learn more at <http://nkdep.nih.gov/about/kicc/index.htm>.

The NIDDK, part of the NIH, conducts and supports basic and clinical research and research training on some of the most common, severe, and disabling conditions affecting Americans. NIDDK's research interests include diabetes and other endocrine and metabolic diseases; digestive diseases, nutrition, and obesity; and kidney, urologic, and hematologic diseases. For more information, visit www.niddk.nih.gov. ■

KIDNEY FUNCTION, continued from page 6

function was between 45 and 74 based on creatinine, the combined equation improved classification for measured GFR below 60, correctly reclassifying 16.8 percent of those with estimated GFR of 45 to 59 to 60 or greater.

Based on projections from the National Health and Nutrition Examination Survey, using the creatinine-only equation, an estimated 23 million American adults may have CKD, and nearly 400,000 people in the United States and 2 million worldwide depend on dialysis to treat kidney failure. ■

New NIH Clinical Trial Website Launched for Public, Health Care Providers

From NIDDK Director's Update

The NIH has a new website, NIH Clinical Research Trials and You, to help people learn more about clinical trials, why they matter, and how to participate. From the first cure of a solid tumor with chemotherapy to the use of nitroglycerin for heart attacks, clinical research trials—or research studies involving people—have played a vital role in improving health and quality of life for people around the globe.

“The ability to recruit the necessary number of volunteers is vital to carrying out clinical research that leads to health and medical advances.”

Francis S. Collins, M.D.,
Ph.D.
NIH Director

Clinical trials are essential for identifying and understanding ways to prevent, diagnose, and treat disease. Research has shown that among the greatest challenges to recruitment of volunteers is the lack of general knowledge about what trials involve, where they are carried out, and who may participate.

“The ability to recruit the necessary number of volunteers is vital to carrying out clinical research

that leads to health and medical advances,” said NIH Director Francis S. Collins, M.D., Ph.D. “This new, centralized resource will make it much easier for the public and health professionals to learn about clinical trials and how people can participate in them.”

The website is at www.nih.gov/health/clinicaltrials. ■



OBESITY DOCUMENTARY, continued from page 7

- Finding that exposure in the womb to maternal obesity or diabetes may increase the risk of obesity or diabetes in offspring, suggesting a critical period for intervention
- Investigating genetic factors contributing to obesity and its complications

To keep moving forward in the quest to prevent, treat, and reduce obesity and its complications, NIH funds obesity-related clinical trials around the country, including on the NIH campus in Bethesda, MD. To find trials in your area and learn how to enroll, visit NIH's Clinical Research Trials and You website at www.nih.gov/health/clinicaltrials. NIH also supports public education

and awareness programs to combat obesity and its complications, including We Can! (Ways to Enhance Children's Activity & Nutrition), the Weight-control Information Network, and the National Diabetes Education Program.

The documentaries were produced by HBO Documentary Films and the Institute of Medicine, in association with NIH and the Centers for Disease Control and Prevention, and in partnership with the Michael & Susan Dell Foundation and Kaiser Permanente.

For more information, go to www.nih.gov/health/NIHandweightofthenation. ■

Updated Webpages

NKDEP Offers New Online Resources for Identifying and Managing Patients with Kidney Disease

To make it easier for primary care providers to find the information they need to manage patients with chronic kidney disease (CKD), the National Kidney Disease Education Program (NKDEP) redesigned its website with improved navigation and expanded, easy-to-understand content. Of particular interest, the new Identify and Manage Patients section distills evidence-based information to assist with patient management—from initial CKD diagnosis to preparation for renal replacement therapy. Specific online NKDEP resources to help you manage patients include:

- The Manage Patients with CKD section, which contains extensive content on monitoring CKD progression, steps to slow progression and reduce complications of CKD, a comprehensive overview of CKD complications and comorbidities, and considerations for addressing a patient's functional status and quality-of-life issues.
- Information and tools to help primary care providers collaborate with nephrologists.
- GFR calculators to help you estimate kidney function for adults and children.
- *The Kidney Disease Education Lesson Builder* (located in the Patient Education section) to help educators create and implement lesson plans for counseling patients with CKD about managing their disease and preparing for RRT.
- The Resource Center, which lists all of NKDEP's publications and tools and allows you to easily sort resources by categories such as Kidney Disease Testing. It also includes a videos tab that features a series of provider education modeling videos (in both English



and Spanish), as well as stories from partners and professionals who have used NKDEP materials in the field.

Additionally, the Get Involved web section has resources for organizations interested in helping NKDEP raise awareness about kidney disease.

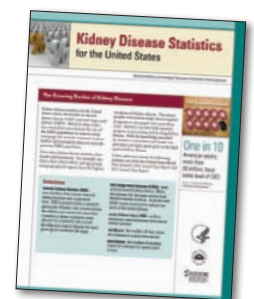
There you can find tools—including e-badges, newsletter content, and social media posts—to help you share NKDEP's free educational resources with community and organization members.

We welcome you to visit the new website and encourage you to share the site with your colleagues and patients!

NKUDIC Offers New Statistics Resources Online

The National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) has posted an updated webpage devoted to kidney and urologic diseases statistics at www.kidney.niddk.nih.gov/statistics. The page contains new links to publications by the Centers for Disease Control and Prevention and the National Center for Health Statistics as well as links to the United States Renal Data System (USRDS) and the new *Urologic Diseases in America* compendium.

A new fact sheet by NKUDIC—*Kidney Disease Statistics for the United States*—uses colorful graphs and charts to present data from the two most recent *Annual Data Reports* by the USRDS. Finally, the new webpage contains a link to additional sources of kidney and urologic diseases statistics. ■

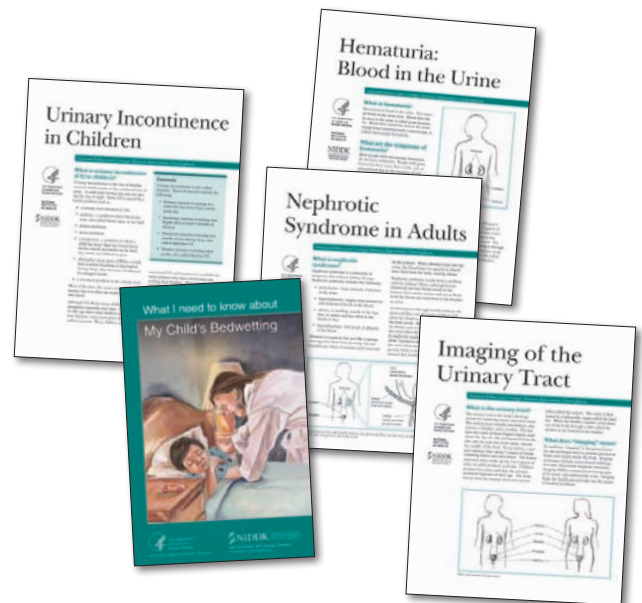


Updated Publications

The NKUDIC has updated the following publications:

- *Goodpasture Syndrome*
- *Hematuria: Blood in the Urine*
- *Imaging of the Urinary Tract*
- *Medical Tests for Prostate Problems*
- *Nephrotic Syndrome in Adults*
- *Pyelonephritis: Kidney Infection*
- *The Urinary System and How It Works*
- *Urinary Incontinence in Children*
- *Urodynamic Testing*
- *What I need to know about My Child's Bedwetting*

These publications are available at
www.kidney.niddk.nih.gov.



Upcoming Meetings, Workshops, and Conferences

The National Institute of Diabetes and Digestive and Kidney Diseases Information Clearinghouses will exhibit at the following upcoming events:

National Kidney Foundation (NKF) 2013 Spring Clinical Meetings

April 2–6, 2013, Orlando, FL

For more information, visit www.kidney.org.

American College of Physicians (ACP) Internal Medicine 2013

April 11–13, 2013, San Francisco, CA

For more information, visit www.acponline.org.

American Nephrology Nurses Association (ANNA) 44th National Symposium

April 21–24, 2013, Las Vegas, NV

For more information, visit www.annanurse.org. ■